



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/663,582	09/18/2000	Udo Gruber	SGL 99/5 US	4122

7590

07/30/2003

Lerner and Greenberg PA  
P O Box 2480  
Hollywood, FL 33022-2480

EXAMINER
----------

THOMPSON, CAMIE S

ART UNIT	PAPER NUMBER
----------	--------------

1774

16

DATE MAILED: 07/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/663,582

Applicant(s)

GRUBER ET AL.

Examiner

Camie S Thompson

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on May 6, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 and 9-68 is/are pending in the application.
- 4a) Of the above claim(s) 23-66 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-22, 67 and 68 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 1774

### DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed May 6, 2003 have been acknowledged.
2. Examiner acknowledges amended claim 1.

#### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 9 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. It is unclear as to what "overlong" fibers are. Overlong fibers are not disclosed in the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-7, 9-22 and 67-68 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the phrase "consisting of". Claims 5 and 6 are dependent from claim 1. Claims 5 and 6 require the matrix to have additional materials. It is unclear as to whether or not the matrix consists only of silicon, silicon carbide and carbon or it contains silicon, silicon carbide, carbon and other materials.

Art Unit: 1774

Claim 1 recites the phrase "separated by a minimum". It is unclear as to what the fiber bundles are separated by.

The scope of "overlong" fibers bundles as required by claim 9 is unclear.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-7, 9-22 and 67-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKee, U.S. Patent Number 6,335,105 in view of Tredway et al., U.S. Patent Number 5,552,213 and in further view of Beier et al., U.S. Patent Number 6,316,086.

McKee discloses a fiber-reinforced composite material that includes a silicon/silicon carbide/carbon matrix as per instant claim 1 (see column 1, lines 41-47 and column 4, lines 7-21). McKee does not disclose the fiber bundles within the composite, the protective layer on at least a portion of the fiber bundles or the types of fibers dispersed within the ceramic matrix as per instant claims 2-4. The Tredway reference discloses a composite that contains a glass-ceramic matrix and a plurality of primary and secondary-reinforcing fibers dispersed in the matrix. The reference also discloses that the secondary reinforcing fibers are shorter than the primary fibers and that the secondary fibers fill the region of the matrix as per instant claims 1, 9 and 10. See the abstract. Tredway et al. also discloses boron nitride particles dispersed in the matrix as a protective layer as per instant claim 2 to improve oxidative stability and lubricity of

Art Unit: 1774

the composite (see column 4, lines 9-10). The reference also discloses that the reinforcing fibers can consist of carbon and silicon carbide as per instant claim 3 (see column 4, lines 21-22). It would have been obvious to one of ordinary skill in the art to have a plurality of primary and secondary reinforcing fibers wherein the secondary reinforcing fibers are shorter than the primary fibers in order to obtain a high strength composite. Additionally, the McKee reference does not disclose other phases within the matrix as per instant claims 5 and 6. The reference also discloses that the ceramic matrix contains suitable glass-ceramic materials consisting of aluminum silicate combinations as per instant claim 5 (see column 2, lines 59-69). Tredway et al. discloses that the fiber bundles are carbon and graphite as per instant claim 7. The use of other materials in the ceramic matrix provides formability, thermal stability and abrasion resistance. Carbon fibers are known to have a great tensile strength. Therefore, it would have been obvious to one of ordinary skill in the art to use boron nitride and alumina in the matrix in order to achieve a composite material that will withstand applications that require high-strength and stiffness and has superior mechanical properties. The length of the fibers is disclosed in the Tredway reference. The discontinuous primary reinforcing fibers are 6 mm to 25 mm and the secondary reinforcing fibers are shorter at 0.5 mm to 2 mm as per instant claims 11 and 12 (see column 3, lines 55-69 and column 4, lines 1-6). The length of the fibers affects the strength of the composite. Therefore, it would have been obvious to one of ordinary skill in the art to have the secondary reinforcing fiber shorter than the primary fibers in order to obtain a reinforced composite with high tensile strength.

Neither McKee nor Tredway disclose using whiskers as per instant claim 4. However, the Beier reference teaches that ceramic matrices can be reinforced with whiskers (see column 6, line

Art Unit: 1774

5). Therefore, it would be obvious to one of ordinary skill in the art to use whiskers in ceramic composites because the composites are easier to produce and easier to shape when whiskers are included (see column 6, lines 27-29). The Beier reference discloses using additions consisting of iron, chromium, aluminum, molybdenum, and titanium in glass ceramic matrices. It would be obvious to one of ordinary skill in the art to add inorganic fillers in the ceramic matrix being motivated by the improved friction and comfort while decreasing the hardness of the composite (see column 5, lines 1-31).

None of the references disclose the width, fiber bundle fraction, length/width/height ratio, weight ratio or the fiber bundle length distribution. However, the Beier reference discloses that the typical thickness for a ceramic matrix that is used in a friction lining is 1 mm to 30 mm.

Therefore, it would be obvious of one of ordinary skill in the art to have the average reinforcing fiber bundle width to be 0.02 mm to 5 mm; the average matrix fiber bundle width to be 0.02 mm to 2mm; the ratio of the reinforcing fiber bundle length to the matrix fiber bundle length to be 1.5 to 10; the ratio of the reinforcing fiber bundle width to the matrix fiber bundle width to be 2 to 500; the weight fraction ratio of the matrix fiber bundles to be between 0.1 and 0.8; and the reinforcing fiber bundle and matrix bundle width at half maximum of fiber bundle length distribution to be 0.01 mm to 15 mm and 0.01 mm to 5 mm respectively. The resulting length/width/height ratio of the reinforcing fiber bundle and the matrix fiber bundle would be expected to be within the range of 2 and 50,000 based on the dimensions of the fiber bundles.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (703) 305-4488. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If

Art Unit: 1774

attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly, can be reached at (703) 308-0449. The fax phone numbers for the Group are (703) 872-9310 {before finals} and (703) 872-9311 {after finals}.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

*Marie R. Yamnitzky*  
MARIE YAMNITZKY  
PRIMARY EXAMINER  
1774